

1. Record Nr.	UNINA9910823950903321
Autore	Ren Hongwen <1964->
Titolo	Introduction to adaptive lenses // Hongwen Ren, Shin-Tson Wu
Pubbl/distr/stampa	Hoboken, N.J., : Wiley, 2012
ISBN	9786613618269 9781280588433 1280588438 9781118270073 111827007X 9781118270080 1118270088 9781118270059 1118270053
Edizione	[1st edition]
Descrizione fisica	1 online resource (288 p.)
Collana	Wiley series in pure and applied optics
Classificazione	SCI053000
Altri autori (Persone)	WuShin-Tson
Disciplina	621.36
Soggetti	Lenses Optics, Adaptive
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction to Adaptive Lenses; Contents; Preface; 1. Optical Lens; 1.1. Introduction; 1.2. Conventional Lens; 1.2.1. Refraction of Light; 1.2.2. A Simple Lens; 1.2.3. A Compound Lens; Index; 1.3. Aberration and Resolution; 1.3.1. Paraxial Optics; 1.3.2. Aberration; 1.3.3. Resolution; 1.4. Merits and Demerits of Solid Lens; 1.5. Adaptive Optical Lenses; 1.5.1. Eye Structure; 1.5.2. Lens Character; 1.5.3. Performances; 1.5.4. The Eye-Inspired Lens; 1.6. Homework Problems; References; 2. Elastomeric Membrane Lens; 2.1. Polydimethylsiloxane (PDMS) Membrane; 2.1.1. PDMS Chemical Structure 2.1.2. Basic Material Properties 2.1.3. Optical Transmission; 2.1.4. Fabrication of PDMS Membrane; 2.2. Device Structure; 2.2.1. Requirements of the Liquid; 2.2.2. Surface Configuration; 2.2.3. PDMS Lens Cell Fabrication; 2.2.4. Performance Evaluation Method; 2.3. Actuators; 2.3.1. Syringe Pump; 2.3.2. Motor Pumps; 2.3.3.

Piezoelectric Linear Actuator; 2.3.4. Artificial Muscles; 2.3.5. Voice Coil Actuator (VCA); 2.3.6. Other Liquid Lenses; 2.4. PDMS Microlens Array; 2.4.1. Device Configuration; 2.4.2. Fabrication Method; 2.4.3. Performance Evaluation; 2.5. Solid PDMS Lenses 2.5.1. Squeezing the Lens's Border 2.5.2. Elongating the Lens's Diameter; 2.6. Hybrid Lens System; 2.7. Summary and Technical Challenges; 2.8. Homework Problems; References; 3. Electrowetting Lens; 3.1. Introduction; 3.2. Surface Tension; 3.3. Contact Angle and Wetting; 3.4. Basic Theory of Electrowetting; 3.5. Droplet Deformation; 3.6. Electrowetting Lens; 3.6.1. Shape of Droplet Surface; 3.6.2. Focal Length Equation; 3.7. Tunable Electrowetting Lens; 3.8. Desired Properties of the Liquids; 3.9. Singlet Lens with Two Liquids; 3.9.1. Lens Cell 1; 3.9.2. Lens Cell 2; 3.10. Microlens Array 3.11. Remaining Challenges 3.12. Summary; 3.13. Homework Problems; References; 4. Dielectrophoretic Lens; 4.1. Introduction; 4.2. Dielectrophoretic Force; 4.3. Dielectric Liquid Materials; 4.4. Singlet Lens; 4.4.1. Continuous Flat Electrodes; 4.4.2. Hole Patterned Electrode; 4.4.3. Well-Shaped Electrode; 4.4.4. Fringing Field; 4.5. Microlens Array; 4.6. Switchable Lens; 4.6.1. Operation Principle; 4.6.2. Beam Diffuser; 4.6.3. Light Shutter; 4.6.4. Display; 4.6.5. Noncontact Electro-optic Inspection; 4.7. Gravity Effect; 4.7.1. Measurement Method; 4.7.2. Operation Principles 4.7.3. Experimental Results 4.8. Applications; 4.9. Summary; 4.10. Homework Problems; References; 5. Other Adaptive Liquid Lenses; 5.1. Introduction; 5.2. Mechanical-Wetting Lens; 5.2.1. Out-of-Plane Tuning; 5.2.2. Hydrodynamic Liquid-Air In-Plane Tuning; 5.2.3. Hydrodynamic Liquid-Liquid In-Plane Tuning; 5.3. Ferrofluidic Transducer Lens; 5.3.1. Ferrofluidic Material; 5.3.2. First Example; 5.3.3. Second Example; 5.3.4. Third Example; 5.4. Electromagnetic Actuator Lens; 5.5. Stimuli Response Hydrogel Lens; 5.6. Acoustic Liquid Lens; 5.6.1. Acoustic Radiation Force 5.6.2. Structure of an Acoustic Lens

Sommario/riassunto

"This is the first book to address the fundamental operation principles, device characteristics, and potential applications of various types of adaptive lenses. Setting out from basic material properties to device structures and performance, this volume covers solid lens, membrane lens, electro-wetting lens, dielectric lens, mechanical-wetting lens, and liquid crystal lenses. Potential applications of these adaptive lenses are also investigated, including image processing and zooming, optical communications, and biomedical imaging. This is an important reference for optical engineers, research scientists, graduate students and undergraduate seniors"--
